

SPECIAL HANDLING

Approved For Release 2003/09/30 : CIA-RDP67B00820R000300130011-7

SHC63-3149-145

Copy # 2

12 February 1963

Gentlemen:

Itak is pleased to submit this proposal covering the design, development and fabrication of one (1) each reconfigured Panoramic Camera System and associated equipment.

This proposal constitutes a bid for one (1) each reconfigured C''' Instrument for special utilization, the cost details of which may be found in Section II of the attached proposal.

Further, our prices for this item is in accordance with the schedule of Section II of the attached proposal.

This proposal is conditioned upon the timely receipt of the Government furnished materials and services, which may be found as an addendum of Section I, the Technical Proposal.

The FOB points for all items is Lexington, Massachusetts, and costs for delivery, as directed by the contracting officer, to points other than the stipulated FOB, will be handled in accordance with the changes article cited in the contract.

Our prices do not contain federal, state, or local taxes, as none are believed applicable. Furthermore, the above prices do not contain a price or charge for royalties in excess of \$250.

Our proposal is quoted on a fixed price redeterminable basis predicated on a ☐ profit and the cost free utilization of existing management and services presently contracted for under Contract BB-550. The contract should be written in such a manner as to assure no prohibition from the utilization of these services. Further, we request a ☐ ceiling.

The price and delivery quotations found in this proposal are predicated on the following terms, conditions, and contract considerations:

1. That your activities will issue a fixed price redeterminable contract substantially in accordance with standard ASPR and AFPI provisions applicable to fixed price contracts with commercial institutions.

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2. That Itek will be granted the use of Government facilities in Itek's possession covered under Air Force facility contract [redacted] on a no charge non-interference basis to the primary purposes of the facility contract.
3. That subject proposal is valid for a period of sixty (60) days after which time, Itek reserves the right to amend the terms and conditions thereof.

Attached herewith for your information and files are fully executed copies of the Contingent Fee Statement and Certificate of Current Pricing.

We are pleased to have been given the opportunity to submit this proposal and wish to assure you that we intend to exert our best efforts in the performance of all work requirements outlined herein. Should you require any further information regarding this proposal, do not hesitate to call upon us. Please direct any contractual correspondence to [redacted]

Very truly yours,

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[redacted]

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This is to certify that, to the best of my knowledge and belief:

(i) complete (pricing data) (and) (cost data)* current as of
April 12, 1963 have been considered in preparing the Proposal
(Date)

3149 ** and submitted to the Contract-
ing Officer or his representative:

(ii) all significant changes in the above data which occurred
since the aforementioned date through April 12, 1963 *** have been
(Date)

similarly submitted; and no more recent significant change in such
data was known to the undersigned at the time of executing this
certificate; and

(iii) all of the data submitted are accurate.

April 12, 1963 Name _____
(Date of Execution)
Title Vice-President
Firm Itek Corporation

Note that 18 U.S.C. 1001 prescribes criminal penalties for
making false representations to the Government.

*Select one or more of the bracketed series of words, as
appropriate, for submission involved.

*Describe the proposal, quotation, request for price
adjustment, or other submission involved, giving appropriate
identifying number, (e.g., RFP No.)

***This date shall be as close to the date of agreement on
the negotiated price or fee as is practicable.

CONTINGENT FEE REPRESENTATION

Bidder represents: (a) That he has not employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract, and (b) that he has not paid or agreed to pay to any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract, and requested by the Contracting Officer.

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12 April 1963

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I T E K C O R P O R A T I O N

RECONFIGURATION OF
C-TRIPLE PRIME INSTRUMENT
FOR SPECIAL UTILIZATION

April 12, 1963

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SECTION I

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OPERATIONAL OBJECTIVE CAMERA CHARACTERISTICS

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- | | | |
|--|---|-----------------------|
| 1. Configuration | Panoramic | |
| 2. Lens Type | <div style="border: 1px solid black; width: 150px; height: 20px;"></div> | |
| 3. Film Type | 70 MM - S0-130 or S0-206 | |
| 4. Format Size | 2 1/4" x 31.6" | 25X1A |
| 5. Dynamic Resolution | <div style="border: 1px solid black; width: 350px; height: 150px;"></div> | |
| 6. Ground Resolved Distance | | |
| 7. Lateral Coverage | | |
| 8. Forward Coverage/Frame | | |
| 9. Percent Overlap | 60% | |
| 10. Total Forward Coverage | <div style="border: 1px solid black; width: 60px; height: 40px;"></div> | Nautical miles |
| 11. Total Area Coverage | <div style="border: 1px solid black; width: 60px; height: 40px;"></div> | square nautical miles |
| 12. Number of Frames | 2700 | |
| 13. Film Length | 7,00' | |
| 14. Weight of Camera System
with film | 160# | |
| 15. Power Required | 240 watts (28 VDC unregulated - 8 amps)
(400 Cycles - AC-1 amp) | |

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*Note: With stereo panoramic and
10% overlap, coverage doubles;
ie - nautic miles forward coverage.*

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INTRODUCTION

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The Itek Panoramic Camera utilizing the [] lens was originally designed as the information gathering instrument in a satellite reconnaissance system. About forty five (45) of these instruments have now been expended either as a single camera or double camera stereo installation and have established outstanding records for photographic performance and reliability.

The installation of this camera in a high altitude jet aircraft requires that we take into consideration a number of factors which, in a satellite installation, are either insignificant, under our control, or not present. These include; the vehicle dynamics such as the roll, pitch, and yaw rates and aircraft vibration, vehicle internal environments of temperature and pressure, external environments of boundary layers and temperatures, and the presence of a window.

Itek has the experience and capability to properly evaluate the pertinent factors and to make such design adjustments and provide such controls as are needed to allow the most suitable integration of this instrument as part of this aircraft reconnaissance system.

VEHICLE DYNAMIC CONSIDERATIONS

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In the aircraft the roll and pitch rates are about [] per second as compared to about [] per second for a satellite. This of course means that, since a stabilized mount is not available, we must rely on short exposures to keep ground smear due to these causes at a reasonable level.

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and altitude is 70,000 feet in this

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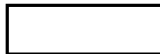
example) as compared to a ground blur of  second

exposure is used. Since blur is also encountered in the pitch direction


it is apparent that our only expedient is to keep exposures to an

absolute minimum. (see appendix)

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Fortunately, the fast  aperture allows us to accomplish this without resorting to such a high speed, coarse grained film that the basic lens-film resolution would be a limiting factor. When used with S0-130 film we can expect a dynamic resolution at low contrast of 

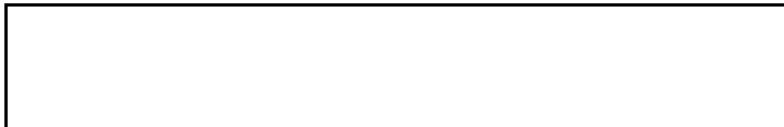
25X1D


At the 70,000 foot altitude this would result in  inch ground

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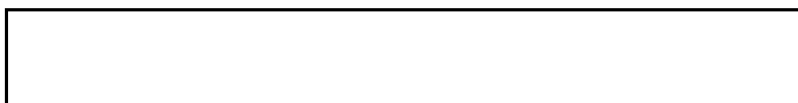
resolution. When combined by using the root sum square method with the roll and pitch smear arrived at earlier we get a resultant dynamic ground resolution (R_{DG}) of:

25X1D



In this comparison, when S0-206 film is used we can expect a dynamic resolution at low contrast of 110 l/mm. Therefore, at 70,000 feet altitude this would result in  ground resolution. Combining this with roll and pitch errors in the same manner as above the resulting dynamic ground resolution:

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Referring to Figure and the section on Operational Capabilities (page 5) shows the desired gain experienced by the selected use of

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SO-130 and SO-206. We proposed to have on hand both types of film, during flight testing and in sufficient quantity to evaluate their performance vs illumination level and camera operation.

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Of course, if a small aperture had forced us to a slow shutter speed and a coarse grained film the ground resolution would be much poorer.

At this point it is worth pointing out that the inherent resolution capability of the panoramic camera is the same over the entire format and any difference in ground resolution results because of the scale change occurring with scan angle. At a 35° angle from the vertical and

25X1D

Vehicle vibrations will also be greatly attenuated by the use of a short exposure since translational vibrations, which in themselves are not harmful, tend to degenerate into rotational modes which produce the same type of ground smear as pitch and roll rates.

VEHICLE ENVIRONMENT CONSIDERATIONS

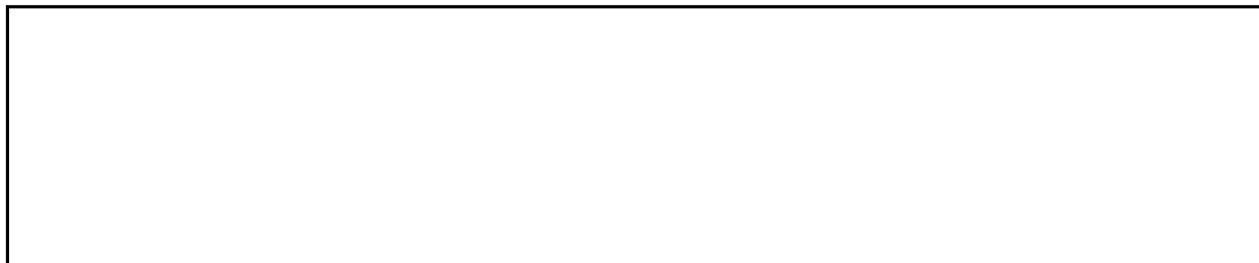
In the aircraft in question there is no attempt made to control the camera bay temperature and the only heat available at present is the spill-over from the cockpit comfort heating. This means that rather large temperature variations can be expected which could degrade the imagery. Itek has recently completed a program which had as its aim the reduction of the sensitiveness of the high acuity panoramic system to temperature variation. The result of this program was the incorporation of a

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If study of the system during the design phase indicates that large temperature variations can occur during operation thus causing the likelihood of temperature gradients in the lens system it may be well to consider a heat source to prevent these non-equilibrium conditions.

25X1A second bay environment we must consider is that of pressure. Total



OPERATIONAL CAPABILITY

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The lens allows great flexibility in operational planning. When the expected operation is at that time of year or over

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those latitudes where the illumination levels are high a higher resolution film, such as SO-206 can be used with the fast shutter speeds so necessary to overcome vehicle dynamics as illustrated earlier.

This will produce ground resolutions close to the maximum capability of the vehicle/camera system. If either location or time is such that poor illumination will be encountered during the mission a faster film such as SO-130 can be used and the large aperture will allow exposures to be short as required for best ground resolution. Figure 2 shows how this can be accomplished.

WINDOWS

Use of Existing Configuration

For purposes of in-flight system evaluation, the use of an existing window configuration, Figure 3 , has been considered. The figure implies the use of only the

If the estimates of window sizes and spacings are correct, then the anticipated vignetting is negligible, and the only questionable area is the optical quality of the window glass. A surface figure of

wedge would be adequate to permit maximum system performance (neglecting environment).

It is Itek's desire, if possible, to utilize these existing windows for the flight test evaluation if we can receive more specific information on the optical qualities we have assumed. On future systems Itek would supply windows designed to be compatible to the camera system capabilities.

The Condition of the Glass

The condition of the glass is significant. Pieces with chips or serious scratches should not be considered, and those which appear

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cosmetically satisfactory should be further examined for uniformity of coating. It is probable that re-coating will be required, and this cycle should be started as soon as possible. It is recommended that the contractor acquire the services of others for this operation.

Environment

Pressure: The specified pressure differential should cause no deleterious sag of the glazing.

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Temperature: The specified temperature differential between inner and outer surfaces is of some concern. The sag is computed to be [] and should be insignificant.

A further temperature consideration is the gradient along a surface, and the resulting change in index and subsequent influence on the wave-front. To maintain maximum system performance, the non linear variations across the glass surface should be held to [] degrees centigrade. It is doubtful if the system for defrosting provides this stability.

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Analysis of Results:

In the final evaluation of system performance, care should be taken to select only portions of the format which correspond to those apertures which do not share windows. []

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[] The windows have undoubtedly not been matched for wedge, and apertures which are shared between windows are bound to introduce image doubling. In addition, varying reactions to environment may be even more disturbing.

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(Ultimately, a single glazing approximately [] for the entire scan could be configured, and therefore eliminate this problem.)

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OPERATIONAL V/H INPUTS

25X1D An investigation of the vehicle flight profile and its effect on the camera operating range shows that the altitude and velocity rate of change of 875 feet/hour for a total change of approximately 2000' that will be experienced during flight tests requires no significant camera cycle rate change or IMC film velocity change. Therefore, a fixed

DATA RECORDING

During the flight test program it will be advantageous to read out the temperature of the drum and scan arm. This can be converted to binary form by an encoder developed by Itek and recorded on the film margin by an existing binary data block. The encoder can accept only one (1) input signal so a simple switch circuit will be employed to read the drum temperature and then the scan arm temperature on alternate exposures. This will provide a complete temperature history of the assembly which defines the position of the film plane.

25X1D A temperature recorder of the Weston Chart type will be carried in the camera bay to get a history for this area.

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TEST PROGRAM

During the Qualification and Acceptance Test Program at the Itek Environmental Facilities, tests will be made to evaluate and correct for degrading influences (roll, pitch, etc.) to the extent that simulation can properly be related to actual flight conditions,

Should the field tests indicate conditions not fully assessed by simulation further verification can be performed by our experienced engineers. Our field representatives are qualified in special techniques to determine, isolate and correct unforeseen difficulties and will be fully equipped with optical and electrical measuring instrumentation. On the basis of prior laboratory qualification and acceptance tests reasonably accurate forecasts of camera flight performance can be made with every expectation of reaching or exceeding the predicted levels.

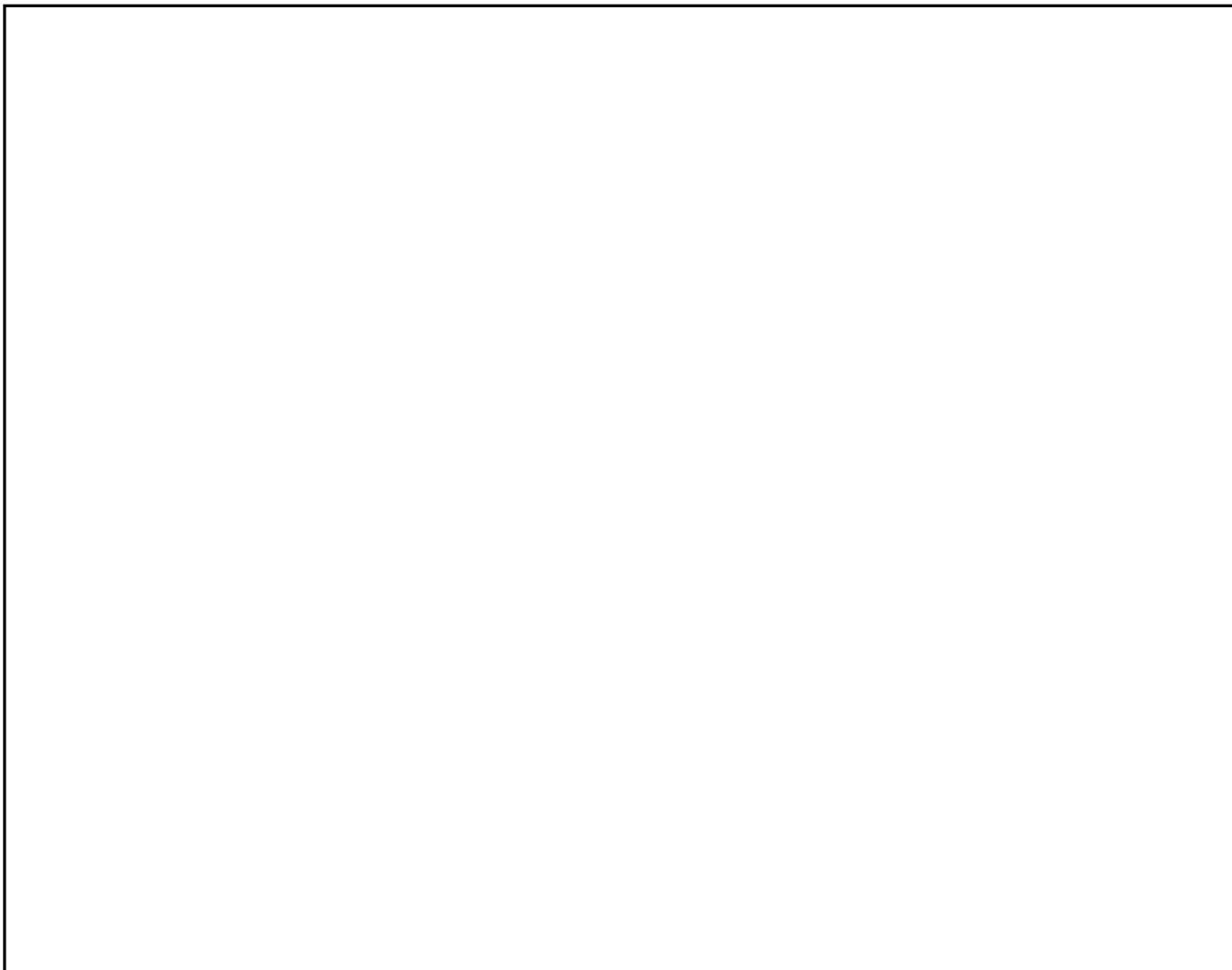
At the test target area calibration of the photographic conditions should be included as part of the field engineering evaluation. Measurements of the targets contrast, reflectance, illumination, atmospheric condition, solar angles and other photometric factors will be gathered by our engineers. They will then be in a position to fully coordinate the camera/aircraft combination into a system of exceptionally high performance, and relate field evaluation data to other areas of the world.

APPENDIX

In order to operate the camera within the vehicle flight parameters it becomes necessary to analyze the ground smear effects and to compensate for them through to proper selection of film type and shutter speed.

The aircraft stability parameters produce the following ground smear values.

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GOVERNMENT FURNISHED EQUIPMENT REQUIRED

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ITEM

PRESENT ACCOUNTABILITY

NEED DATE

1. C''' Instrument
51

Date of Contract
Award

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2.

Date of Contract
Award

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3. 5 each 7000ft. Rolls SO-130
5 each 7000ft. Rolls SO-206

N/A
N/A

50% Date of Contract Award
50% Date of Contract Award

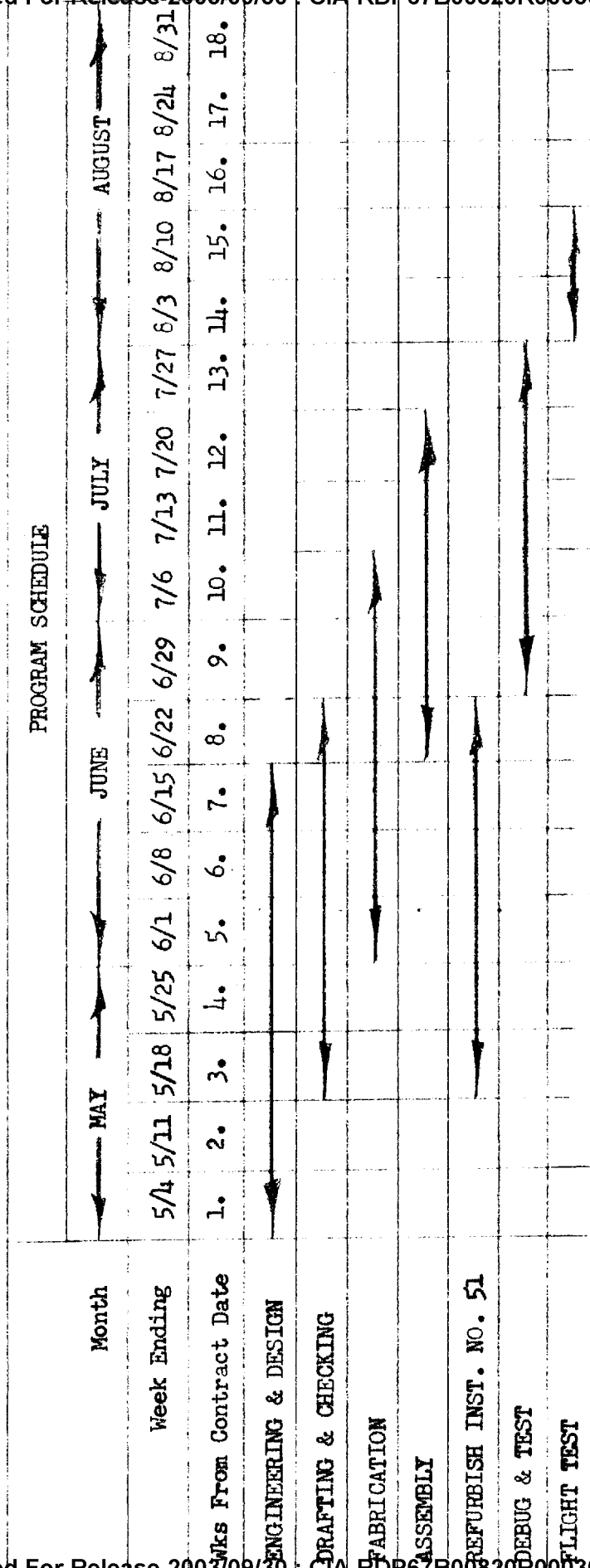
NOTE:

Balance 60 Days Subsequent
To Date of Contract.

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SECTION II



DELIVERY OF FLIGHT UNIT

PROGRAM SCHEDULE

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SCHEDULE OF LABOR RATES

LABOR CLASS

LABOR RATES

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Executive Engineer
Staff Engineer
Senior Engineer
Engineer
Junior Engineer
Senior Technician
Technician
Designer
Draftsman
Senior Draftsman
Optical Shop
Programmer
Technical Writer
Technical Editor
Illustrator
Reproduction
Publications
Inspector
Senior Inspector
Machinist
Experimental Machinist
Senior Experimental Machinist
Assembler
Senior Assembler
Project Secretary

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SCHEDULE OF OVERHEAD G & A

Overhead

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Lexington

Palo Alto



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